

What Is Claimed Is:

1. A laser comprising:

a front mirror and a rear mirror being disposed so
5 as to establish a reflective cavity therebetween;

a gain region disposed between said front mirror
and said rear mirror, said gain region being
constructed so that when said gain region is
appropriately stimulated by light from a pump laser,
10 said gain region will emit light; and

said rear mirror having a phase compensated
reflector to act as an output coupler for a lasing mode
and to reflect pump light at a proper phase so as to
provide phase shifted reflected pump light for a second
15 pumping pass through said gain region;

wherein said gain region is positioned relative to
said rear mirror with said peaks of said reflected pump
light in alignment with said gain region during said
second pumping pass therethrough; and

20 wherein said gain region is positioned relative to
said front mirror and said rear mirror so as to provide
proper lasing.

10020068 121401
TOP SECRET

2. A laser according to claim 1 wherein said gain region is formed by multiple quantum wells (MQW).

3. A laser according to claim 1 wherein said rear mirror is configured to reflect light at said wavelength of said pump laser with a phase of 270° .

4. A laser according to claim 1 wherein said rear mirror is configured to reflect light at a wavelength for lasing with phase of 180° .

5. A laser according to claim 1 wherein said rear mirror comprises a distributed Bragg reflector.

6. A laser according to claim 5 wherein said distributed Bragg reflector comprises a plurality of layers, and one of said plurality of layers has a greater thickness so as to form said phase compensated reflector.

7. A laser according to claim 5 wherein said one of said plurality of layers is a third layer.

8. A laser according to claim 1 wherein said front mirror comprises a semiconductor distributed Bragg reflector.

5 9. A laser according to claim 8 wherein said semiconductor distributed Bragg reflector comprises one of a group consisting of Si, GaAs, InP, AlGaAs, InGaAsP, InAlGaAs, InAlAs, AlGaAsSb and AlAsSb.

10 10. A laser according to claim 1 wherein said rear mirror comprises a semiconductor distributed Bragg reflector.

15 11. A laser according to claim 10 wherein said semiconductor distributed Bragg reflector comprises one of a group consisting of Si, GaAs, InP, AlGaAs, InGaAsP, InAlGaAs, InAlAs, AlGaAsSb and AlAsSb.

20 12. A laser according to claim 10 wherein said semiconductor distributed Bragg reflector comprises a plurality of layers, and one of said plurality of layers has a greater thickness so as to form said phase compensated reflector.

13. A laser according to claim 12 wherein said one of said plurality of layers is a third layer.

10020058 121401